Milwaukee
Water Works

Safe, Abundant Drinking Water.

Service Provider and Environmental Steward

Milwaukee has an abundant water resource in Lake Michigan, a supply that contributes to an attractive and healthy environment, economic stability and social well-being. Lake Michigan water is treated for drinking, used and returned to the lake. As a steward of this resource, the Milwaukee Water Works uses sustainable practices such as supply side conservation, water accountability, energy conservation, operational efficiency and consumer advocacy for repairing leaks and preventing water waste. Sustainable practices ensure the long-term availability of safe and affordable drinking water while considering other water uses (e.g., agricultural, recreational) and other priorities (e.g., environmental health, economic prosperity and social welfare).

The need for efficiency and water savings

Water use has steadily declined in the past four decades, the result of factors that affect all customer classes:

- Loss of wet industry -- brewing, tanning and automotive and heavy equipment manufacturing – and the shift from an industrial economy to a service economy.
- Commercial customers apply ever more efficient processes that use less water.
- Residential customers conserve without active promotion of conservation, using about 2% less water each year.
- Consumers purchase high-efficiency appliances and plumbing fixtures that use less water; new development is more water and energy efficient.
- Wastewater and sewer charges are based on water usage, driving customers to use less water.

The decline in water use appears in these Milwaukee Water Works statistics:

- The amount of water sold dropped from 58 billion gallons in 1976 to 33 billion gallons in 2009.
- From 2006 to 2009, water use decreased 6%.
- The Milwaukee Water Works pumps about one-third its practical system capacity of 360 million gallons per day (MGD) (1/3 = 126 MGD). Average daily pumpage for 2009 was 109 MGD. The utility could provide an additional 125 MGD (total 234 MGD) while maintaining an adequate safety margin to provide water for emergencies.

Less water sold translates into declining revenue as costs to treat and pump drinking water increase.

- The costs to treat any amount of water continue to increase for electric power, fuel, chemicals, wages and benefits, and maintenance of aging infrastructure.

As water use and revenues fall, the Milwaukee Water Works has focused on reducing costs and operational efficiencies.

- A complete reorganization and downsizing in 2003 was recognized with a national Association of Metropolitan Water Agencies efficiency award.
- The utility eliminated 71 fulltime positions from 2000-2009, a 17% reduction in its fulltime workforce. This resulted in savings of $5.7 million in reduced costs.
- Non-critical positions that open through employee retirement or resignation are not filled.
- Non-essential overtime was eliminated.

Supply Side Conservation

Milwaukee's water supply and the capability to treat and provide safe water greatly exceed the demand, so the utility has adopted supply side conservation techniques to save water and energy. The Milwaukee Water Works saved over one billion gallons from 2006 to 2009. It would take decades of conservation by the utility's customers to equal this amount of water savings. The American Water Works Association (AWWA) recognized the Milwaukee Water Works' supply side conservation efforts with two awards for water efficiency in 2008.

- At the two water treatment plants, staff modified the operation of filters by extending the length of the filter runs and reducing the volume of water used to backwash filters. This more efficient operation maintains high

quality treated water and provides ongoing savings of 165 million gallons of treated water each year, as well as energy savings associated with less frequent use of the large washwater pumps.

- Staff invented a tank rinsing device to dilute residual in sodium hypochlorite storage tanks before inspection, resulting in reduced water use from 95,000-150,000 gallons per process to 19,000 gallons, a savings of about 500,000 gallons of treated water per year.
- Leaks in the distribution system have been limited through a number of activities. Scheduled preventive maintenance includes targeted leak surveys to identify non-surfacing water leaks. A multi-year leak survey of the system was completed in 2008.
- Hydrant and water main flushing programs use only an amount of water necessary to reach specified water quality parameters. Rather than flushing for a specified length of time, field personnel use turbidimeters to determine when water turbidity has reached the proper level and stop flushing.
- The utility pressure-tests new and replacement water mains on delivery and before construction to verify they will not leak when put into service.
- The Department of Public Works adopted a Water Works technique to reduce water waste. The city no longer uses hydrants to flood water and sewer main projects to settle the soil around underground trenches, but requires contractors to use mechanical compaction to complete backfill of trenches. The change saves an estimated 20 million gallons of water per year and saves wear and tear on hydrants.
- A public outreach campaign, in its fifth year in 2010, has eliminated the waste of millions of gallons of water by reducing illegal hydrant openings during hot weather. Treating the water only to have it drain into sewers is expensive for all. Water wasted due to illegally opened hydrants has decreased from an estimated 447 million gallons in 2006 (745 hydrant openings) to 27 million gallons in 2010 (45 hydrant openings).
- The Milwaukee Water Works has installed over 2,300 hydrant-locking McGard devices in areas with high repeat hydrant openings. At public school playground Cool Spots, the utility provides supervised sprinkler devices and cool water using fire hoses hooked to hydrants.

Stewardship Partners

The Milwaukee Water Works partners with other agencies to minimize the adverse impacts of water use and management on the watershed.

- To help reduce sewer overflows into Lake Michigan, water flushing activities for mains and hydrants in the combined sewer area are scheduled away from rainy periods to assist the Milwaukee Metropolitan Sewerage District (MMSD) avoid or decrease overflows.
- Since 2007, the Milwaukee Water Works has sponsored the river skimmer, which removes an average 70 tons of floating debris each year from the Milwaukee and Menomonee Rivers. The skimmer is a collaborative effort with the Milwaukee RiverWalk District, MMSD and the Port of Milwaukee.
- The Milwaukee Water Works has been a member of the U.S. Environmental Protection Agency (EPA) WaterSense program since 2007 and the Public Service Commission of Wisconsin (PSC) Conserve Wisconsin program since 2008 to protect water and energy resources. The utility pledged to continue to make operations more water-efficient and to provide customers with water efficiency information.
- As a member of the Milwaukee Water Council, the City of Milwaukee and the Milwaukee Water Works provide technical support to preserve the region's freshwater resource and promote water technology business and research, and education of future water talent.

Demand-side, or Consumer Conservation

The Milwaukee Water Works has developed demand side, consumer conservation activities to emphasize "Use Water Wisely – Control Water Costs." The utility advocates for sensible use of water, reducing water waste, and helping consumers get the best value for the water they use. Milwaukee Water Works customers do conserve water. Residential water use has steadily declined without active promotion of conservation.

- The daily per person, indoor and outdoor use in Milwaukee, in 2009 was 47 gallons (calculated using water sold to residential customers only). From 2005-2009, the five-year average was 50 gallons per person per day for indoor and outdoor use, well below the national average. The AWWA reports daily per person indoor only use was 69.3 gallons while daily per person, indoor and outdoor use, was 171.8 gallons.

Demand-side conservation activities

- The Milwaukee Water Works is collaborating with Clean Wisconsin on a public education program to find and fix household leaks to reduce water waste. Of customers who returned feedback postcards, 66% found leaks and fixed them, with most leaks in toilets and faucets. Of those, 60% used the dye tabs provided. Twenty-one percent said they had no leaks but found the information was useful. Elements of the program include:
  - A new section of the utility website, www.milwaukee.gov/water, Use Water Wisely.
  - A comprehensive brochure, Use Water Wisely-Control Water Costs.
  - Two EPA WaterSense worksheets, modified for Milwaukee, offer information about how to read a water meter, watch your bill for unusually high water use, and finding and fixing leaks.
  - An insert in the first and second quarter 2010 Municipal Services Bills provided Use Water Wisely tips, in English and Spanish, to 168,000 customers.
  - Outreach materials advise customers to track and compare their water use by accessing their account online at the utility's website.
  - All materials are distributed to City of Milwaukee agencies such as public libraries, health centers and permit centers, city cable TV, and elected officials for newsletters and websites.
  - Customer Service Center employees mail a specially marked envelope with the brochure, leak detecting tablets, and a pre-paid feedback card to customers who inquire by phone or visit the center regarding high water use or high sewer charges. Customer Service staff advise over 2,000 customers a year on high water use. These activities lower water and sewer bills and decrease wasted water.
  - The billing system identifies residential and commercial accounts with high water use; on a daily and weekly basis, staff mail letters to these customers with advice about finding and repairing leaks.
  - Meter Services employees provide the information packet to customers when performing in-home leak investigations generated by Customer Service, and as employees replace meters. There are over 1,000 of these home investigations each year. Meter Services also mails letters and brochures with notices of unusually high water use.
  - Commercial Meter Readers manually read the meters of the 1,000 largest customers on a monthly basis and compare current use to past use. They identify changes in seasonal or monthly patterns and report discrepancies for corrective action.
  - The Meter Services Shop opened a bulk water filling station in 2010 for contractors and landscapers so water is metered, paid and accounted for. The utility is working with other contractors and construction and sewer projects to phase out use of hydrants for non-fire suppression activities.
  - Property owners with extraordinarily high water use that could indicate leaks on the owner's property are sent a series of letters asking them to contact the utility for an internal property inspection. The mailings include financial resources to help property owners pay for major repairs.
  - The 2009 EPA-required water quality Consumer Confidence Report, mailed to all customers in the first quarter, featured Use Water Wisely information.
  - Department of Neighborhood Services plumbing inspectors distribute the Use Water Wisely brochure and toilet leak detecting packets to property owners who apply for permits.
  - A children's activity book guides readers through activities to learn about the source of their water and daily use. The book is available online and, along with AWWA Use Water Wisely children's animal stickers, at the Customer Service counter.
  - The Milwaukee Water Works collaborated with an MMSD educational outreach program to provide student Fix a Leak worksheets and toilet leak dye tabs to school classrooms in February.

- An EPA WaterSense partner, the utility has participated in "Fix a Leak Week" since its inception in 2009.
- Each fall and winter, the utility advises customers to protect pipes and meters from freezing. Outreach includes news releases and sharing information with city elected officials and agencies for distribution.
- Meter Services staff participate in GreenPlumbers training on new water-saving technology.

Reducing Energy Use

The Milwaukee Water Works is continually looking to reduce electrical energy use throughout its operations.

- Energy efficient interior and exterior lighting is phased in at the water treatment plants. At the Linnwood Water Treatment Plant, 500-watt incandescent bulbs were replaced with 85-watt compact fluorescents. Astronomical timers, which adjust settings as daylight periods change, were installed to ensure sufficient lighting for the safety of personnel in the filter galleries. Motion sensor activated lighting was installed to turn on lights as needed and turn them off a short time later.
- At the Howard Avenue Water Treatment Plant, lighting needs range from 24-hour exterior and interior to rooms and facilities that require light only when staff is working in the area. An energy audit and subsequent replacement of lighting fixtures reduced the use of 497 incandescent, quartz, and fluorescent lamps and light bulbs to 226 high efficiency bulbs and lamps. The "shedded load" of electrical use was 36,027 watts compared with the previous use of 53,050 watts using old lighting technology (calculated on a 10-12 hour day). A similar project is planned for the Linnwood plant.
- Emphasis is placed on using the most energy efficient pumps for the situation to keep water flow consistent during peak and lower demand times. For example, electrical energy use at a booster station was lowered by installing a variable frequency drive on a station pump.
- A replacement heating, ventilating and air conditioning unit installed in 2008 at the Meter Services Shop uses digital controls instead of pneumatic, resulting in electrical energy savings.
- Energy efficient windows are being installed at the Linnwood plant maintenance building. Plans call for a facilities study and energy audit of heating, ventilating and air conditioning.
- At every utility worksite, lights, computer hard drives, freestanding copy machines and all other electronics are turned off at the close of the business day.

Additional Sustainable Practices

- Biodiesel fuel is used as possible in utility vehicles and equipment that require diesel fuel. A phase-in program begun in 2006 has resulted in the use of B20 biodiesel fuel in 2008 and 2009. Hybrid electric vehicles and diesel equipment to replace gasoline units, plus ethanol E85 capable equipment, is purchased whenever possible.
- Recycling includes paper, plastic, glass, and aluminum, as well as materials such as batteries and fluorescent lighting, and concrete and asphalt at construction and maintenance sites.
- The utility renovated the former Kilbourn Reservoir, in a multi-year public involvement project, into a park by 2008. The earth-friendly design of the park reduces storm water pollution by returning 3.63 acres of pavement to water-absorbing vegetation.
- A "Drink Locally" campaign each June promotes the sustainable practice of drinking tap water, with the distribution of table tents urging consumers to "Fill at the Tap."
- The Milwaukee Water Works helped produce the "Simple Solutions to Water Pollution" brochure created by Milwaukee Water Partners, a consortium of regional environmental groups and the MMSD.

About the Milwaukee Water Works

The Milwaukee Water Works is a national leader in providing high quality, healthful drinking water and monitoring water quality. The utility is owned by the City of Milwaukee and is a self-financing enterprise that pays operating expenses from revenue generated from the sale of treated water. Policy is set by the Mayor and Common Council. The utility is regulated by the U.S. Environmental Protection Agency (EPA) and the Wisconsin Department of Natural Resources (DNR) for facilities, operations, and water quality; and the Public Service Commission of Wisconsin (PSC), for rates and accounting.

The Milwaukee Water Works serves wholesale clients who operate their own water utilities, billing customers and maintaining distribution systems in their communities: Brown Deer, Butler, Greendale, Menomonee Falls, Mequon, New Berlin, Shorewood, Thiensville, Wauwatosa, West Allis. The Water Works provides water wholesale to the Milwaukee County Grounds. Retail customers receive full water service, including customer billing and distribution system maintenance: Greenfield, Hales Corners, St. Francis, Franklin (a portion); West Milwaukee receives billing services from MWW and maintains its own distribution system.

(To reduce waste, please read this online or print it using duplex printing) Rev. 12/7/10